REMARKS

The following Remarks are made in response to the Non-Final Office Action mailed September 16, 2005, in which claims 3-11, 21, 22, 24, 25, 27, 28, and 30-32 were rejected. Claims 3-11, 21, 22, 24, 25, 27, 28, and 30-32 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102 and 35 U.S.C. § 103

Claims 3, 24, 27, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. U.S. Patent No. 4,791,435. Claims 4-9, 10-11, 21-22, 25, 28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Prakash et al. U.S. Patent No. 6,302,507. Applicant respectfully traverses these rejections.

Independent claim 24 includes "a controller configured to estimate an actual temperature of the printhead assembly based on the measured temperature of the printhead assembly, the thermal response model of the printhead assembly, and the ejection history of the ejection elements," wherein "the thermal response model of the printhead assembly includes a first set of parameters when the ejection elements have been fired and a second set of parameters when the ejection elements have not been fired."

Independent claim 27 includes "estimating an actual printhead operating temperature based on a thermal response model of the printhead, an ejection history of the ejection elements, and the current printhead operating temperature," wherein "the thermal response model of the printhead includes a first set of parameters when the ejection elements have been fired and a second set of parameters when the ejection elements have not been fired."

Independent claim 30 includes "determining an estimated actual operating temperature of the printhead based on a thermal response model of the printhead, the current operating temperature of the printhead, and the current operating parameters of the printhead, including an ejection history of the ejection elements," wherein "the thermal response model of the printhead includes a first set of parameters when the ejection elements have been fired and a second set of parameters when the ejection elements have not been fired."

Independent claim 31 includes "a controller configured to estimate an actual temperature of the printhead assembly based on the measured temperature of the printhead

assembly, the thermal response model of the printhead assembly, and the ejection history of the ejection elements," wherein "the thermal response model includes a first set of parameters when the printhead assembly has been printing and a second set of parameters when the printhead assembly has not been printing."

Independent claims 24, 27, 30, and 31, therefore, each include estimating an actual temperature of the printhead assembly based on (1) a measured or current operating temperature of the printhead assembly, (2) a thermal response model of the printhead assembly, and (3) an ejection history of the ejection elements, wherein the thermal response model includes (a) a first set of parameters when the ejection elements have been fired (i.e., the printhead assembly has been printing) and (b) a second set of parameters when the ejection elements have not been fired (i.e., the printhead assembly has not been printing).

With respect to the Smith et al. and Prakash et al. patents, neither of these patents, individually or in combination, teach or suggest a printhead temperature control system as claimed in independent claim 24, a method of controlling a temperature of a printhead as claimed in independent claim 27, a method of controlling a temperature of a printhead as claimed in independent claim 30, nor a printhead temperature control system as claimed in independent claim 31.

For example, the Smith et al. patent is directed to arrangements for controlling the uniformity of ink drops in inkjet printers by providing a control of the temperature of the printhead or pen (col. 1, lines 6-11), wherein thermal models of the pens or printheads are provided and used in conjunction with printhead temperature sensors to provide information useful in controlling the printhead temperature (col. 1, lines 64-67). More specifically, the Smith et al. patent provides temperature compensation and control for both low printhead temperature and high printhead temperature (col. 2, lines 3-5). For example, at low temperatures, the Smith et al. patent provides for nozzle pulsing and/or spitting (col. 2, lines 6-19), at high temperature, the Smith et al. patent provides for nozzle idling or shifting (col. 2, lines 20-25), and if a nozzle is unused for some time, the Smith et al. patent provides for nozzle pulsing and/or spitting (col. 2, lines 26-37) (see also Fig. 3; col. 6, lines 10-19). Furthermore, the Smith et al. patent discloses estimating the printhead temperature based on temperature sensors (col. 4, lines 38-42).

The Smith et al. patent, however, does not disclose estimating an actual temperature of the printhead assembly based on (1) a measured or current operating temperature of the printhead assembly, (2) a thermal response model of the printhead assembly, and (3) an ejection history of the ejection elements, wherein the thermal response model includes (a) a first set of parameters when the ejection elements have been fired (i.e., the printhead assembly has been printing) and (b) a second set of parameters when the ejection elements have not been fired (i.e., the printhead assembly has not been printing). Rather, the Smith et al. patent merely provides temperature compensation and control for different printhead temperatures and only discloses temperature sensors for use in estimating the printhead temperature.

In view of the above, Applicant submits that independent claims 24, 27, 30, and 31 are each patentably distinct from the Smith et al. and Prakash et al. patents and, therefore, are each in a condition for allowance. Furthermore, as dependent claims 3-11 and 25 further define patentably distinct claim 24, dependent claim 28 further defines patentably distinct claim 27, dependent claims 21 and 22 further define patentably distinct claim 30, and dependent claim 32 further defines patentably distinct claim 31, Applicant submits that these dependent claims are also in a condition for allowance. Applicant, therefore, respectfully requests that the rejections of claims 3, 24, 27, and 31 under 35 U.S.C. 102(b) and claims 4-9, 10-11, 21-22, 25, 28, 30, and 32 under 35 U.S.C. 103(a) be reconsidered and withdrawn and that claims 3-11, 21, 22, 24, 25, 27, 28, and 30-32 be allowed.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 3-11, 21, 22, 24, 25, 27, 28, and 30-32 are all in a condition for allowance and requests reconsideration of the application and allowance of all pending claims.

Any inquiry regarding this Amendment and Response should be directed to either James R. McDaniel at Telephone No. (858) 655-4157, Facsimile No. (858) 655-5859 or Scott A. Lund at Telephone No. (612) 573-2006, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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By
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